Chapter 10

Intelligent Product Design: Intelligent CAD

INTRODUCTION

Inevitability of ICAD

Design is an important activity in human’s realization and reform of the world, and all the creativity by human beings derive from the design. The aim of the product’s design is to make sure the function of the product and establish a system of good function, low cost, proper price, etc, which play a decisive role in the technology and beneficial result of the product. Especially in the market economy environment, design is the key to win, and it plays an important role in the development of national economy.

From globalization to mass customization, several trends are affecting the development of CAD and manufacturing tools. Globalization is exerting an influence on the development of CAD. Companies’ running, competition and markets have
gone global, and in response, CAD is taking on more functionality and allowing for increasing collaboration demand between departments.

The major inevitability of ICAD is discussed as follows.

Globalization

Sending jobs to foreign locations continues to be a prevalent and highly controversial-trend. It’s driven by such factors as increasing globalization, the ubiquity of high-speed Internet connections and the rising pressure to increase corporate profits. In fact, in the CAD world, most developers have already placed software teams in India and/or Russia to handle research, development and support. And along with manufacturing, data processing and call center jobs, companies are also taking high-tech engineering design and development work. For example, multidiscipline engineering design and drafting, software development and CAD processing are among the new jobs being outsourcing. By 2015, business analysis firm Forrester Research expects some 3.3 million high-tech and service jobs to be transplanted from the U.S. to other countries.

Increasing Collaboration

Because more companies are choosing to shift operations offshore, sharing data is becoming a greater priority. This has contributed to the trend toward collaboration as a management approach, and as a result, CAD vendors have been charged with the task of incorporating tools that can help different departments work together. “It’s a very big challenge to build in ways to tie in other people,” Robert Kross, vice president of Autodesk’s Manufacturing Solutions Division, tells Design News. “Traditionally, our tools are for technical people who are full time users. Collaboration means we have to tie in other people, financial people and others who aren’t doing design every day. That adds to the challenge, but it’s a necessary component for today’s business.”

Mass Customization

Companies are now placing more emphasis on reducing inventory costs and applying just-in-time manufacturing, a strategy that is paving the way for the mass customization of products. Many firms are no longer producing huge quantities of the same product store in many warehouse which manufacturers did just five years ago. Instead they’re tailoring products to meet customers’ specific needs in order to become more competitive.

Popularity of 3D Modeling

More and more engineers are making the switch from 2D software to 3D modeling. In particular, solid modeling—which depicts product designs via electronic 3D solid models—is taking off. Not only do solids give engineers more design flexibility, they also offer realistic images of products and allow downstream tasks, such as analysis, to be more easily integrated. What’s more, solid modeling supports a decades-long push by the CAD industry to give manufacturing customers “art-to-part” capabilities—bringing a design from the concept to the tooling stage in a completely digital world. By implementing a purely digital process, manufacturers can foster more effective communication between departments, make better products and enjoy greater profits due to a speedier time to market.

Widespread use of Neutral Formats

An increasing number of companies are exchanging information with one another using non-CAD formats, including Adobe’s PDF (portable document format), Autodesk’s DWF (design web format) and SolidWorks’ EDRW (eDrawings). Although translating a CAD file into a non-CAD